

REMARKS

Claims 1, 3-40 are pending in the present application. Claims 1, 3, 4, 7, 8, 13-16, 18, 19, 24-26, 33 and 34 have been amended. New Claims 35-43 have been added. Support for these claims can be found generally throughout the specification, and in particular on pages 9-10 and 20-27, and in the original claims. No new subject matter has been added by the amendments or the additional claims. Based on the following remarks, Applicants respectfully request allowance of the pending claims.

Applicants have amended the specification to denote the type of molecular weight represented by molecular weight values given for the poly(ethylene oxide) resins. No new matter has been added by this amendment.

Rejection of Claims 1, 3-34 under 35 USC § 112, second paragraph

The Examiner rejected Claims 1 and 3-34 under 35 U.S.C. §112, second paragraph, as indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. The Examiner asserted that the recited "types of monomers" in Claims 1, 3-5, 7, 8, 13-16, 18, 19 and 24-26 constituted indefinite subject matter. The Examiner found that it was not apparent how the term "types" when appended to an otherwise definite expression, further limited the claims at issue. Applicants have amended the claims at issue to remove the phrase "types of," rendering these claims definite. Applicants note that Claim 5 did not recite the phrase at issue. Therefore, in view of the above amendments, Applicants respectfully request the withdrawal of this rejection.

The Examiner also found that the recited "molecular weights between about 100,000 g/mol to about 8,000,000 g/mol" in Claims 33 and 34 constituted indefinite subject, since it was not clear as to the exact type of molecular weight intended. Applicants have amended these claims to recite the corresponding type of molecular weight. Applicants have also amended these claims to clarify the recited range of molecular weights. Therefore, Applicants respectfully request the withdrawal of this rejection.

Rejection of Claims 1, 3-32 under 35 USC § 103(a)

The Examiner rejected Claims 1 and 3-32 under 35 U.S.C. §103(a) as unpatentable over U.S. Patent 4,140,668 to Sumi *et al.* (hereinafter Sumi) or U.S. Patent 5,430,090 to Miyamoto *et al.* (hereinafter Miyamoto), in combination with U.S. Patent 3,891,584 to Ray-Chaudhuri *et al.* (hereinafter Ray-Chaudhuri).

The Examiner asserted that Sumi and Miyamoto disclose hot melt adhesive compositions, suitable for paper making such as bookbinding, wherein said compositions are defined basically as containing a polyvinyl alcohol-governed melt mixture. The Examiner found that both the Sumi and the Miyamoto disclosures differ basically from the claimed invention in the non-express guidelines to incorporate, into the hot melt adhesive blend compositions, a graft copolymer of poly(ethylene oxide), as claimed in Applicants' invention.

The Examiner submitted that Ray-Chaudhuri teaches hot melt adhesive compositions, useful in bookbinding, that are defined basically as containing a graft copolymer of a poly(ethylene oxide)-governed melt mixture. The Examiner concluded it would have been obvious to the skilled artisan to add the graft copolymer of poly(ethylene oxide) of Ray-Chaudhuri to the polyvinyl alcohol-governed melt mixture of Sumi or Miyamoto, with a reasonable expectation of obtaining a cumulative, additive effect. The Examiner stated that "[i]t is well established that no patentable invention resides in combining old ingredients of known properties." The Examiner stated that "[t]he combination of two compositions, each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition that is used for the very same purpose is prima facie obvious as authorized by *In re Kerkhoven* (205 U.S.P.Q. 1069, C.C.P.A. 1980)." Applicants respectfully traverse this rejection for the following reasons.

To establish a prima facie case of obviousness, the Examiner must establish that a prior art reference, or combined references, teach or suggest all the claim limitations of Applicants' invention. MPEP §§ 2142-2143. Also, the teaching or suggestion to make the claimed combination, and the reasonable expectation of success, must be found in the prior art, and not based on Applicant's disclosure. See MPEP § 2142; *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d

1438 (*Fed. Cir. 1991*). Applicants respectfully submit that neither the Sumi reference in combination with the Ray-Chaudhuri reference, nor the Miyamoto reference in combination with the Ray-Chaudhuri reference teach or suggest currently pending Claims 1, and 3-32.

Applicants respectfully submit that neither Ray-Chaudhuri, Sumi, Miyamoto, nor the combination of Ray-Chaudhuri with Sumi or Miyamoto, teach or suggest compatible blends of a poly(vinyl alcohol) and a graft copolymer of poly(ethylene oxide). Applicants also respectfully submit that these references do not teach or suggest compatible blends of a poly(vinyl alcohol) and a graft copolymer of poly(ethylene oxide), the blend having improved melt processability and mechanical properties without the addition of plasticizers.

Applicants respectfully submit that one cannot base a determination of obviousness on what the skilled person might try or find "obvious to try." Permitting patentability determinations based on an "obvious to try" test would be contrary to the statute and would result in a marked deterioration of the patent system as an incentive to invest in those efforts and attempts of research. See *In re Tomlinson*, 363 F.2d 928, 931, 150 U.S.P.Q. 623, 626 (C.C.P.A. 1966). The cited art must lead the skilled person to the claimed invention. Nothing in the combined references leads a skilled person to prepare compatible blends of a poly(vinyl alcohol) and a graft copolymer of poly(ethylene oxide), as recited in Applicants' claims. Moreover, contrary to the Examiner's statement, there is nothing in these references that teach or suggest a reasonable expectation of obtaining a cumulative additive effect in, supposedly, adhesive properties, by combining the graft copolymer of Ray-Chaudhuri into the adhesives compositions of Sumi or Miyamoto.

In addition, the compatibility of Applicants' blends was not known at the time of Applicants' invention, and therefore was not obvious from the combination of the cited references. Obviousness cannot be predicated on what is unknown, and even that which is inherent in the cited art, if not known at the time of invention, cannot form a proper basis for rejecting a claimed invention as obvious under § 103. See *In re Shetty*, 566 F.2d 81, 86, 195 U.S.P.Q. 753, 756-57 (C.C.P.A. 1977). A compatible polymeric blend comprises two or more

polymeric components that generally do not segregate into separate phases.¹ Most polymer blends are not compatible.² It was not known at the time of Applicants' invention that compatible blends would form from Applicants' combination of polymer resins. The compatible blends of Applicants' invention are unexpected and nonobvious. Based on the cited references, one of ordinary skill in the art would not have appreciated or recognized the formation of compatible blends as recited in Applicants claimed invention.

Therefore, for at least the reasons given above, Applicants respectfully submit that Claims 1, and 3-32 are allowable over the art of record. Applicants submit that the Ray-Chaudhuri reference in combination with the Sumi reference or the Miyamoto reference, does not teach or suggest currently pending Claims 1, 13, and 24. Since the remaining claims depend directly or indirectly from the above respective claims, Applicants respectfully submit that the Ray-Chaudhuri reference, in combination with the Sumi reference, or the Miyamoto reference, does not teach or suggest these claims. Therefore, Applicants respectfully request the withdrawal of this rejection.

¹ Compatible and incompatible refer to the degree of intimacy of blends, which depends on the method of measurement employed in the examination. From a practical standpoint, it is most useful to refer to a polymer blend as compatible when it does not exhibit gross symptoms of polymer segregation. A blend that is heterogeneous on a macroscopic level would thus be considered incompatible. The simple observation that a blend is compatible is sufficient to establish the material as potentially useful

Daniel W. Fox and Richard B. Allen, *COMPATIBILITY*, in *Encyclopedia of Polymer Science and Engineering*, Jacqueline I. Krischwitz (editor), John Wiley & Sons, New York, 1985, volume 3, page 759.

² When blending two polymers of liquids, the resulting behavior falls into three categories. Either they are miscible and compatible or immiscible and incompatible, or they behave somewhere in between these two extremes.

An example of a miscible, compatible system is alcohol and water. The requirements are similar polarity and structure and the result is a single-phase mixture. With polymers, this system is rare (for example, polystyrene / polyphenylene ether...).

More common is incompatibility and immiscibility as with oil and water or polyamide and polyethylene. The materials have different polarities and structures, and the result is a two-phase mixture with poor properties, an undesirable state.

Rarer still is immiscibility and compatibility at which a mixture's constituents have different properties (e.g. structure, polarity) but show some interaction, because of reactive groups, surface active agents, or compatibilizers. Examples are polymer pairs such as polyamide and poly (ethylene-co-methacrylic acid) or more often, the action of detergents to disperse an oil and water mixture.

Karlheinz Hausmann, *Polymeric Compatibilizers*, in Joseph C. Salamone (editor), *Polymeric Materials Encyclopedia*, CRC Press, New York, 1996, page 1364+

Marked-up Version to Show Changes Made to Specification

Pursuant to 37 CFR §1.121(b), the following replacement paragraphs and sections show all the changes made by the foregoing amendment relative to the previous version of the specification, with deleted text shown in [brackets] and added text shown in underlining:

The paragraph beginning on page 9, line 18, and ending on page 10, line 3, was replaced with the following:

Modification of PEO resins with starting molecular weights of between about 100,000 g/mol to about 8,000,000 g/mol (number-average molecular weight) allows the modified PEO resins to be drawn into films with thicknesses of less than 0.5 mil. Modification of PEO resins with starting molecular weights of between about 300,000 g/mol to about 8,000,000 g/mol is preferred for filmmaking. Films thermally processed from the modified PEO compositions have better softness and greater clarity than films processed from unmodified low molecular weight PEO having a reported molecular weight of 200,000 g/mol or less. Thermal processing of films from high molecular weight PEO modified in accordance with this invention also results in films with improved mechanical properties over films similarly processed from unmodified low molecular weight PEO.

Marked up version of re-written claims

Pursuant to 37 CFR §1.121(c)(1)(ii), another version of the rewritten claims marked up to show all the changes relative to the previous version of the claims is now set forth with deleted text shown in [brackets] and added text shown in underlining:

1. (Thrice Amended) A composition comprising a compatible blend of a poly(vinyl alcohol) and a graft copolymer of poly(ethylene oxide), the blend having improved melt processability and mechanical properties without the addition of plasticizers; and

wherein the graft copolymer of poly(ethylene oxide) comprises a poly(ethylene oxide) backbone main chain, and one or more chains derived from one or more [types of] monomers that differ chemically or configurationally from the poly(ethylene oxide) backbone, and wherein the one or more chains are bonded at one or more points along the poly(ethylene oxide) backbone.

3. (Thrice Amended) The composition of Claim 1, wherein the one or more [types of] monomers comprise one or more vinyl monomers.

4. (Thrice Amended) The composition of Claim 1, wherein the one or more [types of] monomers comprise one or more polar vinyl monomers.

7. (Thrice Amended) The composition of Claim 1, wherein the one or more [types of] monomers comprise one or more hydroxyalkyl esters of methacrylic acid.

8. (Thrice Amended) The composition of Claim 1, wherein the one or more [types of] monomers comprise 2-hydroxyethyl methacrylate.

13. (Thrice Amended) A thermoplastic, water-soluble composition comprising a compatible blend of a poly(vinyl alcohol) and a graft copolymer of poly(ethylene oxide);

wherein the graft copolymer of poly(ethylene oxide) comprises a poly(ethylene oxide) backbone main chain, and one or more chains derived from one or more [types of] monomers that differ chemically or configurationally from the poly(ethylene oxide) backbone, and wherein the one or more chains are bonded at one or more points along the poly(ethylene oxide) backbone.

14. (Thrice Amended) The composition of Claim 13, wherein the one or more [types of] monomers comprise one or more vinyl monomers.

15. (Thrice Amended) The composition of Claim 13, wherein the one or more [types of] monomers comprise one or more polar vinyl monomers.

16. (Thrice Amended) The composition of Claim 13, wherein the one or more [types of] monomers comprise one or more polar vinyl monomers selected from the group consisting of 2-hydroxyethyl methacrylate, poly(ethylene glycol) methacrylates, poly(ethylene glycol) ethyl ether methacrylates, poly(ethylene glycol) acrylates, poly(ethylene glycol) ethyl ether acrylate, poly(ethylene glycol) methacrylates with terminal hydroxyl groups, acrylic acid, maleic anhydride, itaconic acid, sodium acrylate, 3-hydroxypropyl methacrylate, acrylamide, glycidyl methacrylate, 2-bromoethyl acrylate, carboxyethyl acrylate, methacrylic acid, 2-chloroacrylonitrile, 4-chlorophenyl acrylate, 2-cyanoethyl acrylate, glycidyl acrylate, 4-nitrophenyl acrylate, pentabromophenyl acrylate, poly(propylene glycol) methacrylate, poly(propylene glycol) acrylate, 2-propene-1-sulfonic acid and its sodium salt, sulfo ethyl methacrylate, 3-sulfopropyl methacrylate, and 3-sulfopropyl acrylate.

18. (Thrice Amended) The composition of Claim 13, wherein the one or more [types of] monomers comprise one or more hydroxyalkyl esters of methacrylic acid.

19. (Thrice Amended) The composition of Claim 13, wherein the one or more [types of] monomers comprise 2-hydroxyethyl methacrylate.

24. (Thrice Amended) A thermoplastic, water-soluble composition consisting essentially of a compatible blend of a poly(vinyl alcohol) and a graft copolymer of poly(ethylene oxide);

wherein the graft copolymer of poly(ethylene oxide) comprises a poly(ethylene oxide) backbone main chain, and one or more chains derived from one or more [types of] monomers that differ chemically or configurationally from the poly(ethylene oxide) backbone, and wherein the one or more chains are bonded at one or more points along the poly(ethylene oxide) backbone.

25. (Thrice Amended) The composition of Claim 24, wherein the one or more [types of] monomers comprise one or more polar vinyl monomers.

26. (Thrice Amended) The composition of Claim 24, wherein the one or more [types of] monomers comprise one or more hydroxyalkyl esters of methacrylic acid.

33. (Amended) The composition of Claim 1, wherein the graft copolymer of poly(ethylene oxide) is prepared from poly(ethylene oxide) resins with number average molecular weights [between] of about 100,000 g/mol to about 8,000,000 g/mol.

34. (Amended) The film of Claim 27, wherein the graft copolymer of poly(ethylene oxide) is prepared from poly(ethylene oxide) resins with number average molecular weights [between] of about 100,000 g/mol to about 8,000,000 g/mol.

New Claims 35-43 were added.

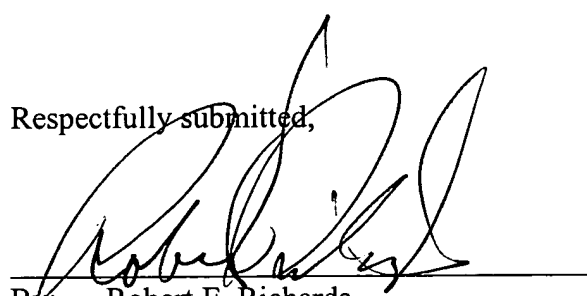
CONCLUSION

The foregoing is a complete response to the Office Action mailed November 27, 2002. Applicants respectfully submit that Claims 1 and 3-43 are patentable. Early and favorable consideration is solicited.

A check in the amount of \$228.00 is enclosed to cover the cost for one additional independent claim and eight additional dependent claims. No additional fees are believed due; however, the Commissioner is hereby authorized to charge any deficiencies which may be required, or credit any over payment, to deposit account No. 11-0855.

If the Examiner believes that there are other issues that can be resolved by a telephone interview, or that there are any informalities that remain in the application, which may be corrected by the Examiner's amendment, a telephone call to the undersigned attorney at (404) 815-6500 is respectfully solicited.

Respectfully submitted,


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